

Name _____
Review of limits and continuity

Calculus Q1 T1

1. Determine the value of c that makes the piecewise-defined function $g(x)$ everywhere

continuous. $g(x) = \begin{cases} \sqrt{x+4}, & x < 5 \\ x^2 + c, & x \geq 5 \end{cases}$

2. Is $h(x)$ continuous for all real numbers? If so show why.

$$h(x) = \begin{cases} x+3, & x \leq -1 \\ -x^2, & x > -1 \end{cases}$$

3. Evaluate $\lim_{h \rightarrow 0} \frac{(2+h)^2 - 4}{h}$.

4. Evaluate $\lim_{x \rightarrow 4} \frac{x-4}{\sqrt{x^2-16}}$.

5. Evaluate $\lim_{x \rightarrow 0} \frac{2^x - 1}{2^x}$.

6. Evaluate $\lim_{x \rightarrow 2} \frac{x^2 + 3x - 10}{x - 2}$.

7. Evaluate $\lim_{x \rightarrow \infty} \frac{2x^3 - 3}{3x^3 + 25}$.

8. Evaluate $\lim_{x \rightarrow \infty} \frac{2x^7 + 3x}{3x^5 + 2x}$.

9. Evaluate $\lim_{x \rightarrow 1} \frac{x - 1}{\sqrt{x^2 + 3} - 2}$.

10. Evaluate $\lim_{x \rightarrow 4} \frac{x + 14}{\sqrt{x^2 - 7}}$.

In # 11 – 20, which of the statements are true about the function $y = f(x)$ graphed and which are false?

11. Find $\lim_{x \rightarrow -1^+} f(x) = 1$.

12. Find $\lim_{x \rightarrow 2} f(x) = DNE$.

13. Find $\lim_{x \rightarrow 2} f(x) = 2$.

14. $f(2) = 2$

15. Find $\lim_{x \rightarrow 1^-} f(x) = 2$.

16. Find $\lim_{x \rightarrow 1^+} f(x) = 1$.

17. Find $\lim_{x \rightarrow 1} f(x) = DNE$.

18. Find $\lim_{x \rightarrow 0^+} f(x) = \lim_{x \rightarrow 0^-} f(x)$.

19. $\lim_{x \rightarrow c} f(x)$ exists at every c in $(-1, 1)$

[note: () means that the endpoints are not included].

20. $\lim_{x \rightarrow c} f(x)$ exists at every c in $(1, 3)$.

[note: () means that the endpoints are not included].

